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REPORT BY THE

Comptroller General

OF THE UNITED STATES

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Coal Slurry Pipelines: Progress And Problems For New Ones

This report briefly summarizes information on some of the key issues concerning coal slurry pipelines--pipelines that carry a mixture of coal and water--and whether pipeline companies need Federal eminent domain legislation to help acquire rights-of-way along proposed routes. It discusses the current status of seven proposed pipelines and points out that at least four may be built by the mid-1980's even without Federal eminent domain legislation.

The report highlights some recent changes that have occurred since the Coal Pipeline Act of 1978, proposed in the 95th Congress, was defeated in July 1978.



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X Chairman and Ranking Minority Member
Committee on Commerce, Science and Transportation
United States Senate *SEN06200*

X Chairman and Ranking Minority Member
Committee on Energy and Natural Resources
United States Senate *SEN06300*

X Chairman and Ranking Minority Member
Committee on Environment and Public Works
United States Senate *SEN06400*

Chairman and Ranking Minority Member
Committee on Interior and Insular Affairs
House of Representatives *HSE 01900*

Chairman and Ranking Minority Member
Committee on Interstate and Foreign Commerce
House of Representatives *HSE02300*

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Committee on Merchant Marine and Fisheries
House of Representatives *HSE 02700*

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Committee on Public Works and Transportation
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X Chairman and Ranking Minority Member
Committee on Science and Technology
House of Representatives *HSE03500*

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For several years ~~the~~ Congress has debated the merits of giving coal slurry pipeline developers Federal eminent domain power to acquire the rights-of-way needed to construct their pipelines. Several proposed pipeline systems, coupled with Federal and State legislative proposals to allow eminent domain power for land acquisition, have generated considerable public controversy. The most recent legislative proposal--the Coal Pipeline Act of 1978--would have allowed pipeline companies to exercise eminent domain power, after obtaining a "Certificate of Public Convenience and Necessity" from the Secretary of the Interior, if rights-of-way could not be acquired through negotiation. Although this legislation was defeated on July 19, 1978, several

large companies continue their plans to build and operate pipelines. This report summarizes some of the key issues concerning these pipelines and the need for Federal eminent domain, discusses the current status of seven proposed pipelines, and points out some Federal regulatory changes which could affect future pipeline development.

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According to industry sources, at least four additional western pipelines may be built by the mid-1980's without Federal legislation, but further pipeline development in the Eastern States hinges on passage of State or Federal eminent domain legislation. Industry sources expect that some form of eminent domain legislation will be proposed in the current session of the Congress.

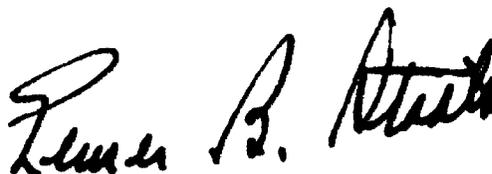
Both Federal and private sources have studied the issues surrounding coal slurry pipeline development. The Office of Technology Assessment issued perhaps the most comprehensive study in March 1978. Our report briefly summarizes and updates information on the following issues:

- Federal eminent domain -/Plans for seven proposed pipelines continue without eminent domain. Industry officials from four of these pipelines believed their lines could be built without Federal eminent domain./
- Water -/While there is enough water available, it may be difficult to obtain in Western States because of prior reservations, legislative restrictions, and location and availability will have to be determined on a case-by-case "site-specific" basis./
- Pollution -/While probably not a major problem since most coal slurry water will be reused in power generating stations, additional study may be necessary before it can be used for other purposes or discharged into rivers or streams./
- Rail Capacity -/While site specific problems may arise, most sources envision no transportation capacity problem, in terms of rail movement at this time or in the foreseeable future, because lead times for railroad investment decisions are generally shorter than those for new coal mines or coal using facilities./ Utility and coal company representatives emphasized the importance the added competition would provide the railroad industry.

Since Senate hearings were held in May and June of 1978 by the Subcommittee on Public Lands and Resources, *SEN 06302* Committee on Energy and Natural Resources, several changes have taken place that could affect future pipeline planning and development. The Environmental Protection Agency has proposed new emission standards for coal-fired power plants which could result in new or changing coal slurry route proposals. The Interstate Commerce Commission has lifted some of its earlier restrictions on long-term rail contracts. This should help the railroads maintain their competitive position. In addition, the Administration favors legislation (the Railroad Deregulation Act of 1979) which would decrease the Federal regulatory control over the railroad industry. This could also affect future pipeline development.

We did not attempt to verify all of the information obtained from railroad and pipeline industry sources. The statements represent their respective views on the issues discussed and are not necessarily GAO's. In many instances, the opinions of neutral sources are also presented.

We are sending copies of this report to Senators and Representatives with a pipeline or proposed pipeline in their States; the Director, Office of Management and Budget; and the heads of departments and agencies concerned with water, transportation, and energy. We will also make copies available to interested organizations as appropriate and to others upon request.



Comptroller General
of the United States



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ABBREVIATIONS

EPA	Environmental Protection Agency	<i>AGC 00024</i>
ETSI	Energy Transportation Systems Incorporated	
GAO	General Accounting Office	
ICC	Interstate Commerce Commission	<i>AGC 00072</i>



INTRODUCTION

The 1973 oil embargo, coupled with the decline of U.S. natural gas and oil reserves, helped trigger a new U.S. national energy policy which called for doubling the production and use of the Nation's vast coal resources. Consequently, many electric utility companies, accustomed to burning oil or natural gas, are considering coal as a future fuel source. At sources closest to many eastern and mid-western power plants, coal has a high sulfur content and current Environmental Protection Agency (EPA) regulations require that users reduce sulfur content--through washing and blending--before burning or install expensive anti-pollution equipment to meet air quality standards. Although low sulfur coal is available in the West, if used, it must be transported to power users in other regions.

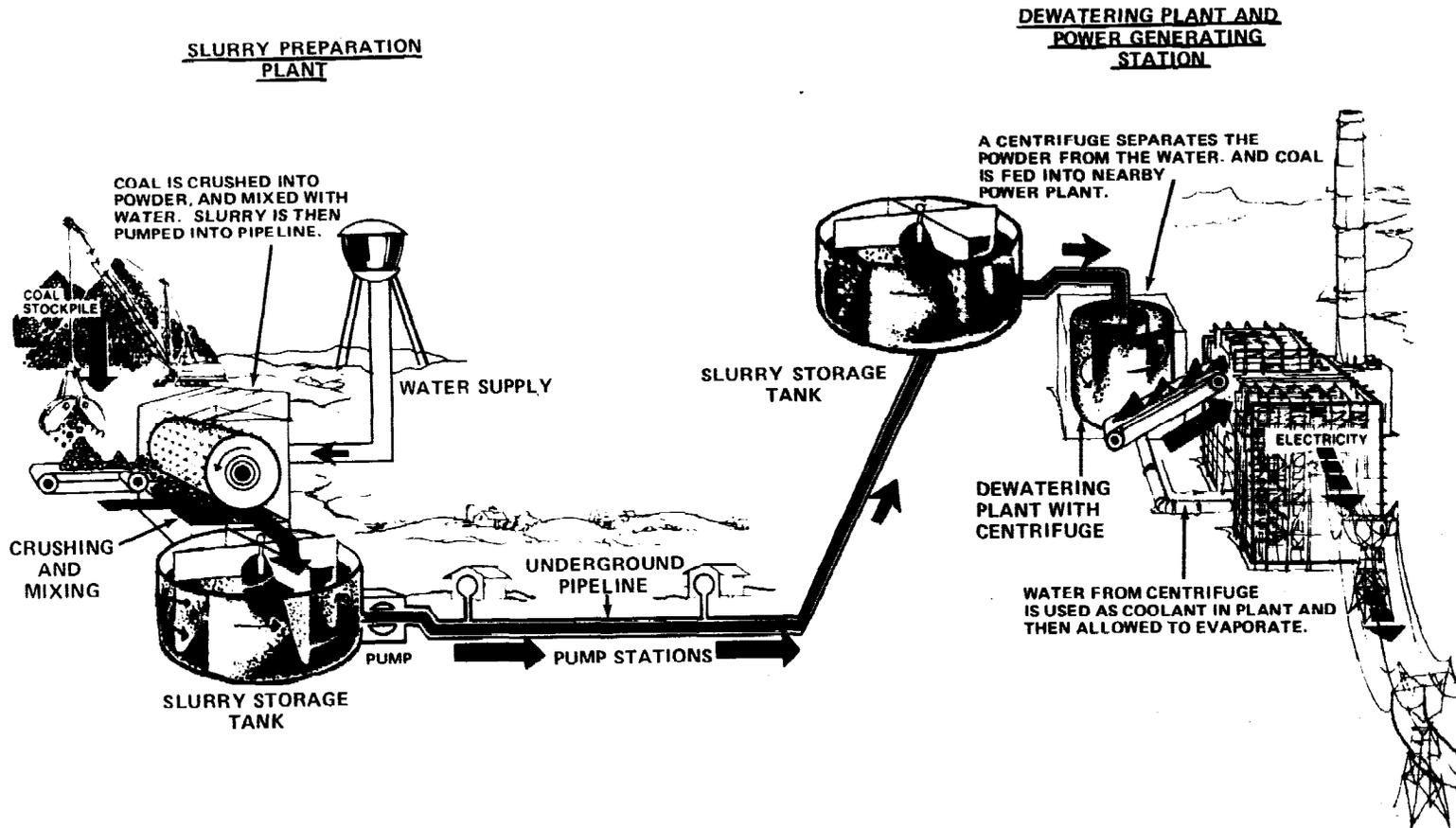
Representatives from some large utility companies fear that moving this increased tonnage could strain existing transportation modes. Therefore, increased interest has focused on coal slurry pipelines as one possible way of moving additional coal from the western coal fields. Slurry pipelines, although a proven technology, are not presently a widespread means of transporting crushed solids. As illustrated on page 3, a typical coal slurry pipeline consists of three major systems: (1) the slurry preparation plant (2) the pipeline transmission system, and (3) the slurry dewatering facilities.

One proposed western pipeline, after dewatering, plans to provide the slurry transport water to agricultural users in southern California. Water from the pipeline currently operating in the Southwest and all of the other proposed pipelines will be used as a coolant at a power plant. At the preparation plant coal is pulverized into a fine powder, mixed with equal amounts of water to form the slurry, and stored in a tank equipped with mechanical agitators to prevent settling. The liquid coal is then pumped through an underground pipeline system, passing through several pumping stations enroute to a dewatering plant. Upon reaching its destination, the slurry is again pumped into agitated tank storage. Next, it is fed into a centrifuge which separates the coal powder from the water. After drying, the coal powder can be burned as a fuel, and the water can be used in the utilities' cooling systems.

Two coal slurry pipelines have already been built in the United States. Only one is still operating, but seven others are in various planning stages. The map and chart on page 23 shows the proposed routes, the annual capacity, and the estimated dates when each line will be operational. A brief synopsis showing the current status of each pipeline is included in Appendix III.

COAL SLURRY PIPELINE SYSTEM

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AFTER NUMEROUS STUDIES AND RECENT ACTIONS BY
FEDERAL AGENCIES, MANY QUESTIONS REMAIN UNANSWERED

Despite numerous Federal and private studies, the controversy surrounding coal slurry pipelines and the need for Federal eminent domain legislation continues.

The basic question--whether coal slurry pipelines would be beneficial to the Nation--touches on many other broader issues, such as

- the availability of water for coal slurry pipelines and the effect this will have on existing and future water users,
- the pollution impact discharged slurry water could have on rivers and streams,
- the existing transportation system's ability to handle the additional coal traffic, and
- the impact pipelines might have on the financial well-being of the railroad industry.

Since the Senate hearings on the proposed coal pipeline act were held in May and June of 1978, EPA has proposed new emission standards for coal-fired power plants. Also, the Interstate Commerce Commission (ICC) has lifted some of its earlier restrictions on long-term rail contracts. Both changes could affect future pipeline planning and development.

IS EXCESS WATER AVAILABLE FOR OPERATION OF
COAL SLURRY PIPELINES, AND, IF SO, HOW WOULD
OTHER USERS BE AFFECTED?

Water for coal slurry pipelines is not a serious problem in most Eastern States. However, all but one of the pipelines currently under study originate in the arid West. Most sources agree that there is presently enough unused water physically available in the western coal-producing regions to serve existing uses as well as provide water for proposed coal slurry pipelines. Although water is physically available in many instances, it is not legally available. Water--or the right to use water--may be difficult to obtain at specific locations because:

- While some available water is not now being used, the right to use that water may have been reserved. This will affect the water's future availability. For example, international treaties, interstate compacts, Indian rights, and the possible exercise of Federal reserve rights are all in this category and will limit the quantity of water which may be available in a given State or river basin.
- Legislative restrictions on the use of water in certain Western States, such as Colorado and Montana prohibit exporting water while other States, such as Wyoming, require special legislative permission.
- Certain Western States discourage transferring water rights from agricultural to industrial use.
- The water rights policy used in the Western States provides that the holder of a relatively recent right may not be able to obtain water in times of scarcity.
- In many cases, such as that of the Bighorn River in Montana and the Upper Colorado River Basin in Utah, applications for the right to use water already exceed the total amount of water.

In addition, other energy oriented industrial requirements, such as power and coal gasification plants, are growing rapidly and will be competing for rights to western water. There are only rough estimates of the total amount of water needed and most of these exceed the known available supplies in the western coal producing regions.

Pipelines can use water that others do not want

Western users have generally obtained their water from readily available sources, such as surface water, water from federally assisted projects, or shallow ground water aquifers. Although pipeline companies may look to some of these same sources for water, they can also look beyond these conventional sources to water that is unuseable or too expensive for others to consider.

Coal slurry pipelines can use saline, brackish, and other low-quality water unsuitable for agricultural and many industrial uses--water which in some cases jeopardizes other fresh water. For example, the salinity levels of many

western rivers are intensified by seepage from saline ground water, natural mineral springs, and salts from irrigated soils.

In the Colorado River Basin, the Bureau of Reclamation is participating in a water quality improvement program aimed at alleviating some of these problems. To help regulate the salinity level in the Basin, it is considering 17 salinity control projects. These include controls to (1) remove salt from localized areas, such as mineral springs, (2) improve watershed management, and (3) reduce salt loading by improving irrigation efficiencies. Four of the 17 units have already been authorized for construction.

One problem faced by the Basin's program is the disposal of intercepted saline water. Bureau sources said that several alternatives, such as evaporation and freezing, are under consideration but that each is an expensive process. If coal slurry pipelines were able to use all or even part of the saline water, Federal dollars currently earmarked for saline water disposal could be saved or redirected and the pipelines would have the benefit of a noncontroversial water source for slurry operations. Bureau sources estimate that between 57,530 and 135,000 acre-feet of saline water at 9 of the 17 proposed salinity control units in the Colorado River Basin will have to be disposed of each year.

Pipeline companies can also afford to use water sources that would be prohibitively expensive to agricultural users. For example, the Black Mesa line and several of the proposed pipelines use or plan to use ground water from deep well sources sealed by rock from surface and other more attainable ground water. One pipeline company estimates that this water will cost about \$400 per acre-foot, compared with \$8 to \$12 currently paid for irrigation water in the area. This type of water is too expensive for agricultural uses, so competition will be primarily from industrial or other energy users who can afford to pay the price.

For example, a farmer who uses 15,000 acre-feet of water each year and is accustomed to paying approximately \$150,000 for water could pay as much as \$6 million for 15,000 acre-feet of water from the deep ground water source proposed by this pipeline company.

Mine mouth electrical generation--
a more water consumptive process

Another transportation option is to move the energy found in coal rather than the coal itself by generating electricity from power plants located at the coal source (mine mouth power plants) and delivering it to consumers through long distance transmission lines. This method has been suggested as an alternative to exporting western water in coal slurry pipelines. However, this alternative has several disadvantages. According to the U.S. Geological Survey and a report prepared for EPA,

- it can be more expensive in certain circumstances;
- the energy cannot be stored, so it must be used or wasted; and
- it also consumes large quantities of water.

From the standpoint of the Western States, perhaps the most significant disadvantage is the amount of water consumed by steam-electric generating stations. Such plants require 7 to 8 tons of water for each ton of coal consumed compared to 1 ton of water for every ton of coal moved by coal slurry pipelines.

For example, the Black Mesa pipeline in Kayenta, Arizona, delivers approximately 4 million tons of coal a year which in turn is consumed by the 1,500-megawatt Mohave Generating Station in southern Nevada. The pipeline uses about 2,550 acre-feet of water to transport this coal while the Mohave Generating Station needs approximately 16,400 acre-feet of water to produce electricity from the same 4 million tons of coal.

Although coal transported to other locations via coal slurry pipelines still requires large quantities of water before it is converted into electricity, the electricity can be generated at locations where water supplies are less critical than the arid Western States where coal is mined.

This was also the conclusion reached in a paper presented by an official from the U.S. Geological Survey at a symposium on Critical Water Problems and Slurry Pipelines in Washington, D.C., on August 26, 1977. The paper states that:

"Certainly a case can be established for moving coal out of the Western States, rather than on-site conversion and subsequent transmission. With the exception of unit trains, it is clear that from the standpoint of impacting the limited water supplies in the west, movement of coal by slurry pipeline uses less western water than is the case for onsite conversion. Strangely enough, the Western States strongly resist the idea of exporting water via slurry pipeline, and yet think little of exporting electricity--a much greater onsite user of water and hence indirectly a much greater exporter of water."

Affect of coal slurry pipelines on competing users also uncertain

Most sources also agree that it is difficult, if not impossible, to accurately predict which competing water uses would be affected (deprived of water) if western water is used for coal slurry pipelines. The major competition would come from other energy-oriented users; however, agricultural users could also be affected. The competition with other energy users will be primarily for "new" or unallocated water. If new water sources cannot be found, a logical substitute might be agricultural or other established users that are willing to sell their "senior" rights.

In summary, water availability for coal slurry pipelines will have to be determined on a case-by-case "site specific" basis. It will depend on such things as the development of new water, the price developers are willing to pay, ground water access, State legislative restrictions, and established user's willingness to sell senior water rights.

WILL COAL SLURRY WATER POLLUTE OUR RIVERS AND STREAMS?

Several potential problems are associated with slurry operations but, according to EPA officials, most should be solvable using current technology. EPA has identified the pollutants remaining in slurry water. However, due to budget constraints, studies aimed at treating these pollutants have been indefinitely postponed. The primary problems are: (1) What pollutants are absorbed by the slurry water? (2) Can such pollutants be treated or removed? (3) If not, what effect will such pollutants have if discharged into the Nation's rivers and streams?

The amount of contamination expected to remain in the water after the coal is removed has been recently examined under an EPA grant. EPA officials said the report "Transport Water Contamination in Coal Slurry Pipelines," which will be issued in early 1979, identifies pollutants which remain in the water. Although they believe the necessary technology exists to adequately treat the slurry water, they also feel additional followup work would be useful to confirm whether all the pollutants identified could be removed using the best available control technology. However, EPA officials said that due to program budget cuts, this will not be done in the foreseeable future.

The primary consideration as to where pollution problems may arise and subsequently where additional study effort should be expended will depend on whether the slurry water is discharged into a river or stream, used at the termination point (e.g., a power plant where the water is used as a coolant) or recycled. According to EPA officials, if the slurry water was discharged into a river or stream, there probably would be an economic, as opposed to a pollution, impact because the slurry water would require treatment before discharge. According to a March 1978 Office of Technology Assessment study on coal slurry pipelines, direct discharge of recovered slurry water to a surface stream would require a permit. Since there are no specific Federal or State criteria for coal slurry pipeline discharges, permit issuance would be based on engineering judgment which considers the current technology available and the receiving streams water quality requirements.

Finally, the Office of Technology Assessment study concluded that the present laws and regulations, when supplemented by proposed changes designed to (1) prevent contamination of ground water, (2) require disposal of solid wastes, and (3) control nonpoint sources of pollution, should adequately protect the environment from any adverse consequences arising out of the construction, maintenance, and operation of a coal slurry pipeline. EPA officials said they could neither confirm or deny this statement until they conduct further studies.

In summary it appears that pollution will not be a major problem since most coal slurry water will be reused in power generating stations. However, one proposed pipeline plans to release its slurry water for agricultural

purposes. Additional study on treating any pollutants which remain in the slurry water may be necessary before it can be discharged into rivers and streams.

ARE COAL SLURRY PIPELINES
ESSENTIAL FOR FUTURE
COAL MOVEMENT?

Sources from the coal slurry pipeline industry indicated that in their opinion, the pipelines' major contribution to the Nation's future transportation requirements is not the expansion of existing transportation capability, but rather the added competition that pipelines will offer the railroad industry. Railroads tend to charge lower prices when faced with barge, rail, or other competition. A specific example of this can be found in the reduced rail rates for movement of coal following the opening of the Ohio coal slurry pipeline in 1957. According to a study prepared for the Bureau of Mines and the Federal Energy Administration, the railroads in this instance were able to sufficiently reduce their prices to undercut the competing pipeline which subsequently ceased operations.

Utility companies have expressed concern over a recent rate increase in San Antonio, Texas. According to the Slurry Transport Association, an ICC decision last October, approving a rate increase for moving coal by rail from Wyoming to San Antonio further demonstrates the need for coal slurry pipelines. The association claims that the new maximum rail charge in San Antonio of \$16.12 per ton makes it cheaper for utilities to burn oil. This seems contrary to national energy plans to convert to coal. Coal slurry pipelines, the association claims, can provide a competitive alternative in the coal transportation market and over long distances, deliver coal more cheaply than by rail.

The railroads, on the other hand, contend that coal slurry pipelines are not needed to provide competition to railroads. The president of a major western coal hauling railroad recently stated that the competition (1) between coal and other types of fuels, such as nuclear and oil, (2) among geographic coal-producing regions, (3) among modes of transportation, such as truck and barge, and (4) among rail carriers has been an influence in keeping western coal transportation costs at levels well below that of other commodities.

Railroad officials feel that the pipelines would draw off the more profitable high volume coal traffic which, in turn, could affect the willingness of investors to provide needed capital for expansion. Also, since railroads are volume efficient, railroad officials fear losing the economies of scale of the high volume lines. The net effect, they warn, could be increasing prices to other utilities and to consumers of other commodities.

The railroads also argue that the long-term "take or pay" contract arrangement used by coal slurry pipelines--which obligates the customer to take or pay for a fixed annual coal volume over a 20 to 30 year period--could restrain trade. Railroads claim that the pipelines take or pay device insulates large coal traffic segments from competition by other transportation modes for extended periods and prevents utilities from taking advantage of benefits which might develop from fuel technology changes. Recently, however, ICC reversed its position and now, in many instances, permits railroads to negotiate longterm contracts. This change is discussed in more detail on page 13.

Another issue discussed in the 1978 Senate hearings is whether granting Federal eminent domain power to pipeline companies would conflict with Federal subsidies already being provided to the railroad industry. A spokesperson from the National Farmers Union questioned whether granting eminent domain for the construction of another major coal transportation system would thwart the congressional intent of the Railroad Revitalization and Regulatory Reform Act of 1976. The act was intended to provide a way of improving the operation and restoring the financial security of the U.S. railroad system. Commenting on this same issue, a March 1978 Congressional Research Service report concluded that: "One very important consideration to be made by Congress, however, in considering whether or not to grant eminent domain nationally, would be the importance of the eastern railroads and their vulnerability to such competition. Another, from the converse side, is whether adequate development and transportation of eastern coal can occur without coal slurry pipelines, because of the condition of the eastern railroads."

Our September 22, 1977, report entitled "U.S. Coal Development--Promises, Uncertainties" (EMD-77-43) summarized the transportation challenge as follows.

"In 1975, railroads carried about 65 percent of the coal traffic. Railroads will be the principal mover of coal in the foreseeable future

as well. The waterway system (the least costly mode) does not directly service many of the areas scheduled for major coal development and it is limited in its capability to expand by the present physical capacity of its locks and by ice in the winter in some areas. Trucks and extra-high-voltage lines cannot compete in terms of price * * *."

"By 1980, railroads anticipate a 95 percent increase over 1974 coal traffic originations. Substantial investments in hopper cars, locomotives, and roadbeds will be required to handle the additional coal traffic.

"GAO discussions with selected railroads and with the Federal Railroad Administration indicate that the railroads will be able to expand their coal handling capacity, even in the West where the increase will be most dramatic. An important consideration in this matter is that it takes less time to expand rail facilities than to construct new mines or electric utility powerplants."

This conclusion is supported by a January 1978 Department of Transportation study which stated that:

"In general the Nation's transportation system is handling current coal volumes without significant problems. Between now and 1985, the foreseeable problems in coal transport can be solved, if monitored closely and acted on in a timely fashion. Beyond 1985, the situation is less clear, although with the lead times for transportation investment decisions being generally shorter than those for new coal mines or coal using facilities, transportation capacity should not be a constraint."

In summary, most sources agree that although site specific problems may arise, there does not appear to be a transportation shortage problem, in terms of coal movement by rail, at this time or in the foreseeable future.

RECENT ACTIONS BY FEDERAL AGENCIES
MAY HAVE AN IMPACT ON COAL SLURRY
PIPELINE DEVELOPMENT

During May and June of 1978, the Subcommittee on Public Lands and Resources of the Committee on Energy and Natural

Resources, United States Senate, held hearings on the proposed Coal Pipeline Act of 1978. Officials from State and Federal agencies, the rail and slurry pipeline industry, as well as others aired their views on the controversial issues surrounding the proposed bill.

Since the hearings, there have been two Federal regulatory changes closely related to some of the issues discussed earlier in Senate hearings. In November 1978 ICC lifted its earlier restriction on long-term coal delivery contracts between the railroads and coal consumers. This should help the railroads maintain their competitive position. Also, in September 1978 EPA proposed new emission standards for coal-fired powerplants which could result in new or changing coal slurry pipeline routes. In addition, the Slurry Transport Association recently announced some additional areas where coal slurry pipelines could be feasible. Many of these areas are in the East, and association officials felt this could make coal slurry pipelines more of a national issue.

ICC relaxes controls over long-term delivery contracts for rail carriers

ICC recently lifted its restriction on long-term contracts for rail carriers. Earlier, at Senate hearings, several railroad sources stated that coal slurry pipelines had an unfair advantage over competing railroads because pipelines can enter into long term contracts which obligate the customer to take or pay for a fixed volume of coal annually for periods up to 30 years--thus obtaining long-term rights to some of the more profitable coal transportation business and permanently removing customers from the marketplace. In the past, ICC had prohibited such contracts for the railroads, however, on November 9, 1978, ICC reversed its position.

ICC staff felt this new position should lessen any competitive edge held by pipelines and help the railroads maintain their future share of coal movement. However, railroad representatives stated that the pipelines will still have certain advantages. They argue that ICC requires railroads, as common carriers, to perform many unprofitable services on low volume branch lines that service both large and small customers while no similar requirements exist for pipelines. Furthermore, they argue the pipelines will not be as closely monitored by ICC and are still not bona-fide common carriers since they only serve a few high volume customers and are not required to transport coal for other customers that request their services.

We discussed the question with ICC and were told that under the provisions of the proposed Coal Pipeline Act of 1978, pipelines would have been required to set reasonable rates and charges for and provide service, on an equal basis, to all similarly situated persons requesting pipeline transportation. However certain actions, such as market entry and abandonment requirements, were not covered. ICC also said that until new legislation is introduced it would be difficult to say just how closely pipelines would be regulated.

Sources from the Slurry Transport Association told us that coal slurry pipelines would fulfill their responsibility to service all customers by openly soliciting business during the design stage and offering to provide services to all on an equal basis.

EPA proposes stricter air emission controls

EPA has also proposed new regulations that could affect pipeline development. In the September 19, 1978, Federal Register, EPA proposed new standards for electric utility steam-generating plants to comply with the Clean Air Act Amendments of 1977. One issue under consideration is whether coal-fed power plants using low sulfur content coal must achieve the same percentage reduction in potential sulfur dioxide (SO₂) emissions as those burning higher sulfur content coal. If so, expensive "scrubbing" equipment would also be required at plants burning low-sulfur coal.

Scrubbers are devices that wash SO₂ and dust out of gases emitted from a plant's smoke stack. EPA is considering two options--a full control option which requires an 85-percent reduction in SO₂ emissions and a partial control option which requires a reduction in the 20 to 33-percent range. Under the full control option, both high and low sulfur coal would require the same treatment--this could remove the advantage of burning low sulfur coal. The full control option is EPA's proposal, but the Department of Energy and several utility companies favor the partial control option (the 33-percent reduction is backed by the Department of Energy, and the 20-percent reduction is supported by at least 35 utility companies). An EPA representative said that, under the partial control option, there would still be economic advantages to ship low sulfur western coal East. According to an EPA official, a decision should be made some time in April.

However, if full scrubbing is required, the same EPA official stated that western coal will no longer look as economical to easterners. Western coal, which is generally

lower in sulfur content than eastern coal, would still require the same percentage emission reduction. Consequently, eastern utility companies would probably look to area suppliers, hoping to cut transportation costs since essentially the same emission control equipment will be needed regardless of the coal sulfur content. Therefore, given present scrubber technology, the full control option may result in new or changing coal slurry route proposals with more pipelines originating in the eastern coal fields. Another EPA official, however, cautioned that foreseeable improvements in scrubber technology may again lessen any economic advantage of using high sulfur content coal under the full control option.

Additional routes already under consideration

The Slurry Transport Association recently announced that in addition to the pipelines currently planned or under study, there are several additional "corridors" under consideration for coal slurry pipeline suitability--a corridor is a likely route from coal sources to coal users. Many of the potential corridors originate in the Eastern States. An association spokesperson stated that these corridors could make coal slurry pipelines more of a national--as opposed to regional--issue. The corridors are shown on the following map.



SOURCE: SLURRY TRANSPORT ASSOCIATION

PLANS FOR NEW PIPELINESCONTINUE EVEN WITHOUTFEDERAL EMINENT DOMAIN LEGISLATION

In addition to the Black Mesa pipeline currently operating in the Southwest, seven additional pipelines are under consideration--six originating in the West and one in eastern Kentucky. According to industry sources, at least four of the six western pipelines could be built by the mid-1980's without Federal eminent domain legislation. However a spokesperson for the sixth western pipeline--whose plans have been temporarily postponed--said this pipeline would never materialize without eminent domain. Only one of the western companies had located a firm water supply--the others were in various stages of negotiation for water rights. Although the eastern pipeline is not plagued with water supply problems, a company spokesperson stated that his company's pipeline cannot be built without either Federal or State eminent domain legislation. Currently, the company is working with the State legislatures in the pipeline's proposed path (app. IV shows the States that according to the Slurry Transport Association already have eminent domain statutes for coal slurry pipelines).

At least two of the proposed pipelines depend on some form of eminent domain legislation; however, representatives from the six pipelines we interviewed stated that they would probably not use Federal eminent domain if it were similar to the legislation proposed as the Coal Pipeline Act of 1978. They felt it was too restrictive as to who could own and operate pipelines and there were too many Federal agencies involved in the approval process.

The map on page 23 shows proposed pipeline routes, annual capacity, and estimated operational dates. Additional information concerning each pipeline proposal is discussed in the following pages.

ALTON PIPELINE

The proposed pipeline system consists of two independent coal slurry pipelines. Both originate in the Alton coal field in southern Utah and will be constructed on the same right-of-way. The longest line is 183 miles and terminates at a power station north of Las Vegas, Nevada. It will deliver approximately 9.1 million tons of coal each year. The second line will be 68 miles long and transport about 2.5 million tons per year to a power station on the Arizona/New Mexico border.

Nevada Power Company, project manager for the pipeline, filed an application for an Environmental Impact Statement with the Bureau of Land Management, Department of the Interior, and has already submitted most of the data required for a first draft. Bureau officials stated that although the Bureau had experienced some delays, a draft statement should be released by mid-1979.

The company plans to use ground water--between 5,400 and 7,800 acre-feet per year--from the Navajo sandstone formation and has filed with the Utah State Engineer for water rights. The State Engineer must approve the application and grant permission to export State water.

A company spokesperson indicated that pipeline right-of-way is not considered a problem. About 142 miles or 78 percent of the land the pipeline crosses is Federal land, and 21 miles is State or county land. The remainder--about 20 miles--is privately owned and rights-of-way have already been purchased. Rights-of-way for the Federal, State, and county lands cannot be obtained until the Environmental Impact Statement is approved.

Company sources estimate that the shortest pipeline should be operational in 1984 and the other between 1985 and 1988. They said the pipeline does not depend on Federal eminent domain legislation because they have already acquired all private rights-of-way and their estimated operational date is not contingent on such legislation.

ENERGY TRANSPORTATION SYSTEMS INC.

Energy Transportation Systems Inc. (ETSI) is developing plans for a 1,378-mile coal slurry pipeline to transport 25 million tons of coal each year from the Powder River Basin in northeast Wyoming to White Bluff, Arkansas, and Baton Rouge, Louisiana (developers claim coal could also be delivered to users in Nebraska, Kansas, and Oklahoma). The proposed pipeline will be jointly owned by Bechtel Corporation, a major engineering and construction firm; Lehman Brothers; Kuhn Loeb, an investment banking firm; and Kansas-Nebraska Gas and United Energy Resources, both pipeline-oriented companies.

In 1974 the State of Wyoming granted ETSI the right to 20,000 acre-feet of water a year from a large underground aquifer--the Madison Formation. However, water rights are subject to the conditions that ETSI not

- withdraw more than 20,000 acre-feet in any one year
- interfere with existing Wyoming water users, or
- obtain water from depths less than 2,500 feet.

Each deep well permit also requires compensatory measures should ETSI's pumping affect the water supply of existing users. ETSI officials said that this water is too costly for farmers and ranchers to use. They estimate their water will cost at least \$400 an acre-foot, while farmers and ranchers in the area pay about \$8 to \$12 an acre-foot.

ETSI has already obtained rights-of-way for most of the land the pipeline will cross. This required 67 lawsuits with the railroads to cross their rights-of-way. ETSI has won 66 cases--one of which has been appealed--and the final case has not yet come to trial.

Since most rights-of-way have already been obtained, ETSI representatives said they do not need Federal eminent domain to complete the pipeline. However, not having eminent domain power increased the length of the pipeline about 31 miles, and ETSI estimates this will add about \$5.8 million per year to the cost of delivering 25 million tons of coal.

In May 1978 ETSI applied to the Bureau of Land Management for an Environmental Impact Statement--the pipeline will cross about 30 miles of Bureau land. ETSI is preparing a detailed plan which the Bureau will use to draft a statement. Bureau sources said once the draft is prepared, it generally takes another 1-1/2 to 2 years before a final statement can be issued.

ETSI officials said they plan to begin construction some time in 1981 and the pipeline should be operational by the second half of 1983. They said their construction schedule does not depend on Federal eminent domain legislation and that they would probably not have used such legislation as proposed in the Coal Pipeline Act of 1978 because working with three Federal agencies would cause too many delays.

SAN MARCO PIPELINE

The San Marco pipeline will originate in southern Colorado and annually transport 15 million tons of coal 900 miles to Houston, Texas. The feasibility study for the pipeline is being financed by the Houston Natural Gas Corporation,

Houston, Texas, and Rio Grande Industries, Denver, Colorado-- a subsidiary of the Denver Rio Grande Railroad.

The sponsors hope to use water from an underground source in southern Colorado's San Luis Valley. They purchased 960 acres of valley land in an area they claim is hydrologically separated by mountains from the rest of the State. They have drilled about 23 test wells to determine whether the water is connected to other water sources. To secure rights for the water, they must obtain a decree from a special court which deals only with water matters. They filed for water rights with the water court located in Alamosa, Colorado, and think they can prove that use of the water for a coal slurry pipeline will not adversely affect other State surface or ground water sources. They also must prove that no one with prior rights will be damaged and that theirs is a beneficial use. A spokesperson said that hopefully, the petition will be reviewed in October 1979. They must also contend with a Colorado State law which forbids exporting State water. They have discussed the statute with the State Engineer and believe that it can be proved unconstitutional.

Also, they hope to start negotiations for rights-of-way once a firm water source is established. However, they did not view rights-of-way as a serious problem because the proposed route crosses only three States--Colorado, New Mexico, and Texas. Furthermore, approximately 80 percent of the route is in Texas, a State which already has eminent domain legislation for coal slurry pipelines.

A Houston Natural Gas spokesperson stated that his company estimates the pipeline will be operational by 1983. He also said that the construction schedule does not depend on Federal eminent domain legislation.

GULF INTERSTATE NORTHWEST PIPELINE

Northwest Energy Company, Salt Lake City, Utah, and Gulf Interstate Engineering Company, Houston, Texas, have temporarily shelved their plans to build a 1,100-mile pipeline from northeast Wyoming to north-central Oregon. A Gulf Interstate official said that although studies had shown such a line to be technically and economically feasible, the coal demand was insufficient to support a 10-million-ton-per-year pipeline. He attributed this to the concentration of hydroelectric plants and experimentation with nuclear energy in the northwest.

The same source also said that before the pipeline could have been built along the proposed route, either Federal or State eminent domain legislation would be needed. He cited the strong railroad influence in Wyoming, Idaho, and Oregon, as the reason such legislation was essential.

WYTEX PIPELINE

Texas Eastern Transmission Corporation, a Houston, Texas, pipeline company is currently planning a coal slurry pipeline which will transport approximately 26 million tons of coal each year from coal fields in southern Montana and northern Wyoming to consumers in the Texas Gulf Coast area.

The pipeline system will need approximately 20,000 acre-feet of water each year. As a water source, the sponsor has proposed building a water project to divert and store about 40,000 acre-feet of water each year from the Little Bighorn River in northern Wyoming. They plan to divert most of the water at periods of peak runoff caused by melting ice and snow. The company claims that Wyoming municipal and agricultural users presently do not use this water because they find it too expensive to divert and store. A company representative said that the remaining 20,000 acre-feet of water would be available to other State users. Plans are to pipe water underground to coal fields in the Powder River Basin of northeast Wyoming and possibly into Montana coal fields. According to a company spokesperson the Wyoming legislature passed a bill authorizing WYTEX to export 20,000 acre-feet of water each year (the bill became law on February 23, 1979). WYTEX now has 90 days to work out details for the proposed water source.

The company has done some preliminary work developing alternative routes, but has not started negotiations for rights-of-way. Another company spokesperson said that hopefully WYTEX will not need Federal legislation because two States in their proposed route already have State eminent domain. He stated that if Federal legislation were passed, WYTEX would probably use it only as a last resort.

Current plans are to start construction some time in 1983, and they hope to be operational by 1985.

FLORIDA PIPELINE

Six southeastern utility companies are studying the feasibility of building a 1,500-mile coal slurry pipeline from eastern Kentucky to southern Florida. A spokesperson

from Florida Gas Company said that two separate studies indicate that a coal slurry pipeline along this route would result in significant transportation savings.

Water for this eastern pipeline is thought to be readily available from such sources as the Ohio River. Further exploration for a firm water source will be delayed until problems with rights-of-way are cleared up.

A company official told us that the pipeline could not be built without eminent domain legislation--either State or Federal--necessary to acquire rights-of-way. Unlike western railroads, many eastern railroads can prevent pipelines from crossing their track routes. In addition, rail lines are more concentrated in the Eastern States. The pipeline developers are currently working closely with State legislatures in an attempt to get eminent domain legislation passed in the States the pipeline crosses. The same official said the developers are concentrating on the States because they need legislation which does not place undue restrictions on pipeline developers. This same official felt that the Federal bill proposed last year had too many restrictions which would have caused costly delays and excluded coal users from owning shares in a pipeline project.

The pipeline developers plan to continue their efforts to build an east coast pipeline and estimate that it will be in operation by 1985 or 1986--but only if either State or Federal eminent domain legislation is passed.

PACIFIC BULK COMMODITY TRANSPORTATION SYSTEM

For several years, the Boeing Engineering and Construction Company (a division of the Boeing Company) has been studying the feasibility of building a coal slurry pipeline to transport coal to the west coast and export it to the Far East. In 1978 the Maritime Administration--interested in integrating slurry transportation technology into the American Maritime industry--entered into a contract with Boeing to further study the feasibility of this concept.

Several alternative routes have been considered. The baseline route (most likely route) originates in the coal-producing region of Emery, Utah, and terminates at Port Hueneme, California, north of Los Angeles--a distance of about 645 miles. Two suppliers have tentatively agreed to provide up to 11 million tons of coal each year. The line will transport a minimum of 10 million tons of coal

each year to an offshore terminal where the slurry will be dewatered and shipped abroad.

Foreign investors are also participating in the study and plan to reslurry the coal at the Far East destinations, transporting it to markets in Japan and Korea.

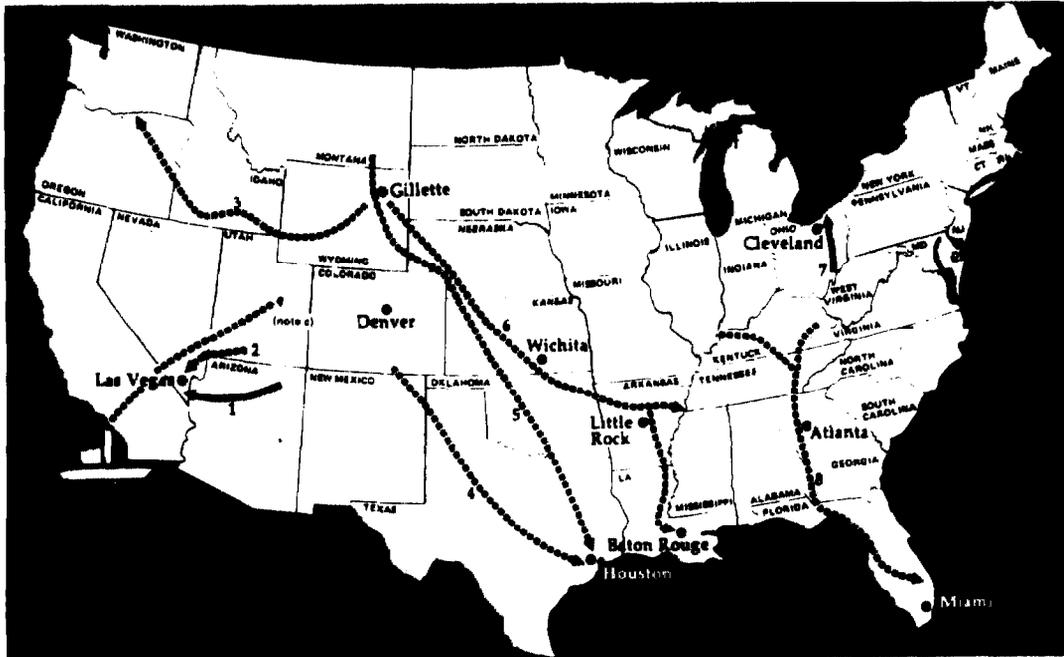
Boeing estimates that it will need about 8,000 acre-feet of water each year and plans to release the slurry transport water for agricultural purposes after dewatering. It hopes to find water with low salinity levels to reduce water treatment costs at the termination point. The company is currently considering both surface and ground water sources in the upper Colorado River Basin.

Although Boeing has not yet started obtaining rights-of-way, the baseline route will have to cross a total of seven railroad tracks.

Company officials would not estimate when the line might be operational, but a company source indicated that further public announcements concerning the pipeline would be made around March 1979.

COAL SLURRY PIPELINE SYSTEMS

EXISTING PIPELINES **————** PLANNED OR UNDER STUDY **-----**



<u>PIPELINE SYSTEM</u>	<u>LENGTH</u> (Miles)	<u>ANNUAL CAPACITY</u> (Millions of tons)	<u>DATE OPERATIONAL</u> (Current Estimate) (note a)
1. BLACK MESA PIPELINE	273	4.8	IN OPERATION
2. ALTON PIPELINE	183	11.6	1983-88
3. GULF INTERSTATE-NORTHWEST PIPELINE	1,100	10.0	POSTPONED
4. SAN MARCO PIPELINE	900	15.0	1983
5. WYTEX PIPELINE	1,260	26.0	1985
6. ETSI PIPELINE	1,378	25.0	1983
7. OHIO PIPELINE	108	1.3	CLOSED
8. FLORIDA PIPELINE	1,500	53.0	b/ 1985-86
9. PACIFIC BULK COMMODITY TRANSPORTATION SYSTEM	645	10.0	NO ESTIMATE

a/ ESTIMATES GIVEN TO GAO BY PIPELINE COMPANY REPRESENTATIVES.

b/ ASSUMES THAT EMINENT DOMAIN LEGISLATION (FEDERAL OR STATE) WILL BE PASSED WITHIN THE NEXT 3 YEARS.

c/ MOST LIKELY ROUTE UNDER CONSIDERATION

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